

8. Nuclear arms control and non-proliferation

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I. Introduction

In the spring of 2010 there was new momentum behind global efforts to promote nuclear disarmament and non-proliferation. In April Russia and the United States signed the Treaty on Measures for the Further Reduction and Limitation of Strategic Offensive Arms (New START), mandating further verified reductions in their deployed strategic offensive nuclear forces. Also in April the USA hosted a summit meeting that gathered heads of state and government to support measures to reduce the risk of nuclear terrorism and to increase the security of nuclear materials and facilities worldwide. In addition, in May at the eighth five-yearly Review Conference of the 1968 Treaty on the Non-Proliferation of Nuclear Weapons (Nuclear Non-Proliferation Treaty, NPT), the states parties reaffirmed the treaty as the principal legal and normative foundation of the global non-proliferation regime. The conference adopted by consensus a final document containing substantive recommendations for advancing the treaty's principles and objectives.

However, during 2010 little progress was made towards resolving the long-running controversies over the nuclear programmes of Iran and the Democratic People's Republic of Korea (DPRK, or North Korea), which have continued to raise international concerns about the spread of nuclear weapons. These concerns were heightened during the year when North Korea revealed that it had constructed a previously undeclared uranium enrichment plant.

This chapter reviews these and other developments in nuclear arms control, disarmament and non-proliferation in 2010. Section II describes the conclusion of Russian–US negotiations on New START and examines the main limits and provisions of the treaty. Sections III summarizes the US-sponsored Nuclear Security Summit meeting held in Washington, DC, and notes several nuclear security-related developments. Section IV describes the proceedings and results of the 2010 NPT Review Conference and highlights some of the principal points of contention during the meeting. Section V examines the renewal of diplomatic efforts to address international concerns about Iran's nuclear programme against the background of intensified legal and alleged extra-legal measures to curtail the country's

sensitive nuclear fuel cycle activities. Section VI describes new developments in North Korea's nuclear weapon programme and the continued diplomatic impasse over the fate of that programme. Section VII presents the conclusions.

II. Russian–US strategic nuclear arms control

In 2010 Russia and the USA concluded a strategic arms reduction treaty to succeed the 1991 Treaty on the Reduction and Limitation of Strategic Offensive Arms (START).¹ The replacement of START, which expired on 5 December 2009, had become a high priority for both countries since START's comprehensive verification regime was the primary means by which they monitored each other's strategic nuclear forces. The START regime also served as the basis for verifying the implementation of the additional nuclear force reductions mandated by the 2002 Strategic Offensive Reductions Treaty (SORT, also called the Moscow Treaty), which lacked its own verification provisions.² Senior Russian and US officials expressed concerns that if the START verification arrangements were no longer observed, the strategic forces of their countries would become much less transparent to one another.³ More generally, the conclusion of the new treaty was seen, especially in the USA, as an important step towards constructively 'resetting' Russian–US relations.⁴

New START negotiations

Formal negotiations between Russia and the USA on a treaty to succeed START were opened in Geneva in May 2009.⁵ A total of eight rounds of talks had been held by the end of 2009, during which several substantive differences emerged.⁶ The most significant of these centred on force ceilings and proposed changes to START's counting rules (i.e. the rules for attributing a specific number of warheads to specific delivery vehicles). Disagreements also arose over verification procedures related to the exchange of telemetric data from strategic missile flight tests and on arrangements for monitoring the production of new mobile missile systems. In addition, the negotiations were complicated by Russia's long-

¹ For a summary and other details of START see annex A in this volume.

² For a summary and other details of SORT see annex A in this volume.

³ See e.g. Gottemoeller, R., 'New START: security through 21st-century verification', *Arms Control Today*, vol. 40, no. 7 (Sep. 2010).

⁴ Weir, F., 'Obama's US–Russia reset hangs on Senate approval of START treaty', *Christian Science Monitor*, 15 Nov. 2010.

⁵ The US delegation was led by Assistant Secretary of State for Arms Control, Verification and Compliance, Rose Gottemoeller. The Russian delegation was headed by Anatoly Antonov, Director of the Security and Disarmament Department at the Russian Ministry for Foreign Affairs.

⁶ See Kile, S. N., 'Nuclear arms control and non-proliferation', *SIPRI Yearbook 2010*, pp. 383–84.

standing concerns about US missile defence plans in Europe and its insistence on including binding restrictions on those plans.

The negotiations resumed in Geneva on 20 January 2010, having failed to reach an agreement before START's expiration. Russian and US officials indicated that they were close to bridging the remaining differences over verification and monitoring issues.⁷ The final stage of the negotiations was complicated, however, by Russia's concerns about changes announced by the USA in its missile defence deployments planned in Europe.⁸ Following a series of telephone conversations between Russian President Dmitry Medvedev and US President Barack Obama that reportedly focused on the missile defence issue, the two presidents announced on 26 March that an agreement had been reached.⁹ At a ceremony in Prague on 8 April 2010, Obama and Medvedev formally signed New START.¹⁰

New START limits and verification provisions

New START consists of three legally binding elements: (a) a preamble and main text, which establish the treaty's basic provisions and undertakings; (b) a lengthy protocol, which defines the treaty's terminology and lays out procedures for observing its provisions and monitoring compliance; and (c) three technical annexes to the protocol that elaborate specific inspection, notification and verification arrangements.¹¹ The treaty's duration will be 10 years, unless superseded by a subsequent agreement; the parties may extend the treaty for a period of no more than 5 years. It establishes a Bilateral Consultative Commission (BCC) as a compliance and implementation body that will meet at least twice annually, unless otherwise agreed.

Central treaty limits

New START imposes three main limits on Russian and US strategic offensive nuclear forces.¹² First, it limits each side to no more than 1550 accountable nuclear warheads deployed on strategic missiles and bombers. This represents a nominal decrease of approximately 30 per cent from the 2200 limit on accountable warheads set by SORT and a decrease of nearly 75 per

⁷ Sweeney, C., 'Russia hopes for prompt U.S. nuclear deal', Reuters, 22 Jan. 2010.

⁸ 'U.S. missile interceptors planned for Romania by 2015', Global Security Newswire, 9 Feb. 2010, <http://www.globalsecuritynewswire.org/gsn/nw_20100209_4015.php>; and Baker, P., 'Twists and turns on way to arms pact with Russia', *New York Times*, 26 Mar. 2010.

⁹ 'US and Russia announce deal to cut nuclear weapons', BBC News, 26 Mar. 2010, <<http://news.bbc.co.uk/2/hi/8589385.stm>>; and Baker (note 8).

¹⁰ President of Russia, 'Russian-US Treaty on Reduction and Limitation of Strategic Offensive Arms has been signed', 8 Apr. 2010, <<http://eng.kremlin.ru/news/271>>.

¹¹ The text, protocol and 3 technical annexes of New START are available at US Department of State, Bureau of Public Affairs, <<http://www.state.gov/t/avc/newstart/c39903.htm>>. See also annex A in this volume.

¹² The limits will take effect 7 years after the treaty's entry into force on 5 Feb. 2011.

Table 8.1. Summary of Russian–US nuclear arms reduction treaties' force limits

Treaty	Date of signature/ entry into force	Total treaty-accountable nuclear warheads	Total strategic nuclear delivery vehicles ^a	Expiration date
START I	31 July 1991/ 5 Dec. 1994 ^b	6000	1600	5 Dec. 2009
START II	3 Jan. 1993/ .. ^c	3000–3500	None ^d	..
SORT	24 May 2002/ 1 June 2003	1700–2200	None	31 Dec. 2012
New START	8 Apr. 2010/ 5 Feb. 2011	1550	800 ^e	10 years after entry into force

SORT = Strategic Offensive Reductions Treaty; START = Strategic Arms Reduction Treaty.

^a Strategic nuclear delivery vehicles are intercontinental ballistic missiles (ICBMs), submarine-launched ballistic missiles (SLBMs) and long-range bombers.

^b In May 1992 Belarus, Kazakhstan and Ukraine signed the Lisbon Protocol with Russia and the USA, making all 5 countries parties to START I.

^c START II never entered into force.

^d START II would have prohibited the deployment of multiple independently targetable re-entry vehicles (MIRVs) on ICBMs and would have limited parties to 1700–1750 SLBMs each.

^e No more than 700 may be deployed.

Source: Annex A.

cent from the START limit of 6000 accountable warheads (see table 8.1). Second, New START limits each side to no more than 800 deployed and non-deployed launchers for intercontinental ballistic missiles (ICBMs) and submarine-launched ballistic missiles (SLBMs) and deployed and non-deployed long-range 'heavy' bombers equipped to carry nuclear weapons. Non-deployed delivery systems include training and test launchers, bombers and submarines in overhaul from which the missiles have been removed. Third, within the total limit on launchers, each side will be allowed no more than 700 deployed ICBMs, SLBMs and heavy bombers.¹³

In negotiating these limits, the US and Russian positions reflected the different compositions of their strategic nuclear forces after the cold war. The US force has more delivery vehicles with fewer warheads on each, while the Russian force has fewer delivery vehicles but more warheads on each. Russia accordingly sought to sharply reduce limits on delivery vehicles—to as low as 500—in order to constrain the USA's considerable advantage over Russia in missile 'upload' potential (i.e. the ability to rapidly

¹³ White House, Office of the Press Secretary, 'Key facts about the New START Treaty', 26 Mar. 2010, <<http://www.whitehouse.gov/the-press-office/key-facts-about-new-start-treaty>>.

redeploy nuclear warheads held in storage onto ICBMs and SLBMs).¹⁴ The US position was to limit deployed warheads while insisting on a sufficiently high ceiling on delivery vehicles to preserve the current structure of its 'triad' of land-, sea- and air-based strategic forces.

Russia initially sought to include a provision in New START that would ban US deployment of conventional warheads on strategic ballistic missiles, as part of the US Strategic Command's Prompt Global Strike plan.¹⁵ The two sides agreed that the treaty's limits would apply to US ICBMs and SLBMs that are armed with conventional instead of nuclear munitions.¹⁶

New START does not place restrictions or limits on the deployment of missile defences—one of the most contentious issues in the treaty negotiations.¹⁷ The preamble contains non-binding language in which the two sides recognize 'the existence of the interrelationship between strategic offensive arms and strategic defensive arms' and that 'this interrelationship will become more important as strategic nuclear arms are reduced'. At the insistence of the USA, the preamble also notes that 'current strategic defensive arms do not undermine the viability and effectiveness of the strategic offensive arms of the parties'. Russia and the USA each issued unilateral statements when they signed New START, clarifying their positions on the relationship between New START and missile defence. While the statements did not impose any new obligations on either side, they set out positions that framed the subsequent ratification debates in both countries.

Warhead attribution rules

New START contains detailed definitions and rules for calculating the number of deployed strategic warheads allowed by the treaty ceiling. This involved changing the 'counting rules' used in START, which had attributed a fixed number of warheads to each ICBM and SLBM—in most cases equal to the maximum number of re-entry vehicles that the missile had been tested with—regardless of whether an individual missile carried fewer warheads. In contrast, under New START the parties will count the actual number of warhead re-entry vehicles emplaced on deployed ICBMs and SLBMs.

¹⁴ In contrast to Russia, which had to eliminate ageing and obsolescent strategic missile delivery systems, the USA met the START-mandated limit on deployed strategic warheads largely by removing some of the warheads carried on ICBMs and SLBMs and placing them in storage. See Pikayev, A., 'New START: preliminary thoughts in Moscow', James Martin Center for Nonproliferation Studies, Monterey Institute of International Studies, 7 Apr. 2010, <http://cns.miis.edu/stories/100407_start_pikayev.htm>.

¹⁵ See chapter 7, section II, in this volume.

¹⁶ Woolf, A., *The New START Treaty: Central Limits and Key Provisions*, Congressional Research Service (CRS) Report for Congress R41219 (US Congress: Washington, DC, 23 Dec. 2010), p. 18.

¹⁷ To address 'break-out' concerns, the treaty prohibits the parties from converting ICBM and SLBM launchers to launchers for missile defence interceptors and from converting launchers of missile interceptors to launchers for ICBMs and SLBMs. White House (note 13).

Regarding heavy bombers, New START follows its predecessor in attributing a fixed number of warheads to each aircraft. However, under the new treaty each deployed bomber, whether equipped with nuclear-armed cruise missiles or nuclear gravity bombs, will be counted as carrying only one nuclear warhead, even though the aircraft can carry much larger weapon payloads.¹⁸ One rationale given by negotiators for the attribution rule was that bombers, due to their long flight times, do not pose the same threat of surprise attack as ICBMs or SLBMs.¹⁹ Some non-governmental experts pointed out that the bomber counting rule created a loophole that allows the two sides to deploy considerably more warheads than counted under the treaty.²⁰

Verification and monitoring provisions

New START's verification and monitoring regime is built around an extensive database that identifies the number, type and location of items limited by the treaty. It provides for the use of notifications, inspections and exhibitions to confirm information in the database. Among other measures, the treaty requires each party to place a so-called unique identifier (an alphanumeric tag) on all missiles, associated launchers and bombers. The unique identifier will be included in notifications any time an ICBM, SLBM or heavy bomber is moved or changes status. The treaty establishes procedures to allow inspectors to confirm the unique identifier during the inspection process. The treaty also provides for Russia and the USA to continue to use national technical means to gather data about the numbers, locations and characteristics of each other's strategic forces.²¹

New START's inspection and monitoring provisions have been considerably simplified in order to lower implementation cost and to reduce operational burdens arising from the inspections process. Under New START, there are only two types of inspection, compared to the nine different types of inspection specified in START.²² Type 1 inspections will occur at bases for ICBMs, submarines and heavy bombers, and may be conducted up to 10 times annually by each side. The inspections have two objectives: (a) to

¹⁸ Under START, the number of warheads attributed to individual US and Soviet/Russian heavy bombers were 10 and 8, respectively. The US B-52 bomber can carry up to 20 nuclear-armed cruise missiles.

¹⁹ Pifer, S., 'New START: good news for U.S. security', *Arms Control Today*, vol. 40, no. 4 (May 2010). US officials indicated that the attribution rule was the result of Russia's refusal to allow the necessary on-site inspections of weapon storage bunkers at its bomber bases.

²⁰ Oelrich, I. and Kristensen, H., 'New START treaty reduces limit for strategic warheads but not number', Public Interest Report, Federation of American Scientists, 22 June 2010, <<http://www.fas.org/blog/pir/2010/06/22/new-start-treaty/>>.

²¹ Union of Concerned Scientists, 'Verification of New START', Fact sheet, 13 July 2010, <http://www.ucsusa.org/nuclear_weapons_and_global_security/nuclear_weapons/technical_issues/verification-of-new-start.html>; and Woolf (note 16), pp. 13–15.

²² Union of Concerned Scientists (note 21).

confirm the accuracy of declared data on the number and type of deployed and non-deployed launchers, missiles and bombers at the bases; and (b) to confirm that the number of warheads located on deployed ICBMs and deployed SLBMs and the number of nuclear armaments for deployed heavy bombers are consistent with the numbers listed in the treaty database. The latter objective reflects the change in the warhead counting rules for missiles under New START.²³ Type 2 inspections will occur at other facilities housing non-deployed launchers and missiles and may be conducted up to eight times annually. The main objectives of the inspections are to verify declared data on the number and type of non-deployed ICBM and SLBM launchers and stored missiles and to confirm that formerly declared facilities 'are not being used for purposes inconsistent' with the treaty.²⁴ While the total number of inspections has decreased under the new treaty, individual inspections are to be more comprehensive—in some cases gathering data that would have required two inspections under START.

The New START negotiations had to resolve two main disputes related to verification and monitoring arrangements. The first arose over Russia's initial unwillingness to retain START's provisions for the broadcast and exchange of telemetry information from all strategic missile flight tests. Russia reportedly resisted retaining the START ban on the encryption of telemetry data because it planned to introduce a new generation of strategic missiles while the USA had no plans to do so.²⁵ The two sides eventually agreed to exchange telemetric information on missile flight tests—up to five times annually—as a transparency and confidence-building measure, even though the data was not needed to monitor compliance with any particular limit in New START.²⁶ The second dispute concerned START's provisions for monitoring mobile ICBMs. In the new treaty, the two sides adopted streamlined procedures under which mobile missiles will be tracked using their unique identifiers and inspected at missile bases in the same manner as other systems. They also adopted measures designed to facilitate US monitoring by national technical means, primarily satellites, of new Russian mobile missiles.²⁷

²³ The protocol specifies procedures under which inspectors are permitted to count the actual number of re-entry vehicles carried on an individual ICBM or SLBM at a given base that they designate for inspection. New START protocol (note 11), part V, section VII.

²⁴ New START (note 11), Article XI.3.

²⁵ Collina, T., 'START stalls; talks continue', *Arms Control Today*, vol. 40, no. 1 (Jan./Feb. 2010).

²⁶ Pifer (note 19).

²⁷ Pifer (note 19).

Ratification proceedings in Russia and the United States

On 13 May 2010 President Obama transmitted New START to the US Senate for its advice and consent. In subsequent committee hearings, current and former administration officials, along with senior military officers, urged bipartisan cooperation to ratify the treaty.²⁸ Republican senators largely refrained from opposing the treaty outright but expressed concerns about its potential impact on US ballistic missile defence programmes and the adequacy of proposed investments for maintaining the US nuclear stockpile. They also criticized the treaty for not addressing non-strategic weapons or including a timetable for doing so.²⁹

The ratification proceedings were marked by a high degree of partisan political acrimony, with considerable uncertainty about whether the treaty would come to a vote by the year's end. On 16 September the US Senate Foreign Relations Committee voted to approve a ratification resolution that contained numerous conditions introduced by Republican committee members.³⁰ During the final debate in the Senate, the Democratic leadership accepted two amendments to the draft resolution of ratification. These were non-binding statements that codified the Senate's understanding of the treaty but did not directly affect its language. One amendment emphasized the US commitment to pursuing a limited missile defence programme. The resolution had already included language stating that New START did not impose any limitations on the deployment of missile defences, other than to prohibit the conversion of ICBM and SLBM launchers for missile defence purposes. The second amendment affirmed the US intention to proceed with maintaining and modernizing its nuclear weapon production capabilities.³¹ Following a concerted campaign that included a promise by President Obama to seek an additional \$4.1 billion in funding for the US nuclear weapon production complex, on 22 December 2010 the Senate ratified New START by 71 votes to 26.³²

In Russia, consideration of a draft resolution of ratification was resumed in the State Duma and the Federation Council following the US Senate's ratification vote.³³ The Russian draft resolution contained several pro-

²⁸ Collina, T., 'Senate begins hearings on New START', *Arms Control Today*, vol. 40, no. 5 (June 2010).

²⁹ Sokov, N. and Pomper, M., 'New START ratification: a bittersweet success', James Martin Center for Nonproliferation Studies, Monterey Institute of International Studies, 22 Dec. 2010, <http://cns.miis.edu/stories/101222_new_start_ratified.htm>; and Collina (note 28).

³⁰ Cornwell, S., 'Senate panel OKs new arms treaty with Russia', Reuters, 16 Sep. 2010.

³¹ The text of the US Senate's resolution of advice and consent to ratification is available at <<http://www.state.gov/t/avc/rls/153910.htm>>.

³² 'Obama hails Senate vote to back Russia nuclear treaty', BBC News, 23 Dec. 2010, <<http://www.bbc.co.uk/news/world-us-canada-12056024>>.

³³ On 8 July 2010 the Duma's International Relations Committee had voted to recommend ratification of New START but subsequently revoked the recommendation after US senators proposed

visions linking the implementation of the nuclear arms reductions mandated by New START to limits on US missile defence deployments. These provisions were drafted largely in response to statements from the US Senate that New START did not restrict development of US missile defences in any way. While not seeking to ban missile defence, the resolution emphasized the linkage between strategic offensive and defensive forces and stated that the deployment by the USA of a missile defence system 'capable of significantly reducing the effectiveness of the Russian Federation's strategic nuclear force' could lead to a Russian withdrawal from New START.³⁴ On a related issue, the resolution imposed restrictions on Russia's exchanges of certain categories of telemetric data if these could help the USA to refine its capabilities in intercepting Russian strategic missiles and warheads.³⁵ The Duma's ratification bill also contained two supplementary statements about future nuclear force modernization plans and preconditions for making further nuclear arms reductions. On 25 January 2011, following a third and final reading of the resolution, the State Duma ratified New START by 350 votes to 96.³⁶ The following day the Federation Council unanimously approved the accord.³⁷

New START entered into force on 5 February 2011 when the Russian Foreign Minister, Sergei Lavrov, and the US Secretary of State, Hillary Rodham Clinton, exchanged the ratification documents on the sidelines of an international security conference in Munich.³⁸

After New START: next steps

In the wake of completing New START, disagreements arose between Russia and the USA about the focus and timing of the next steps in bilateral arms control. On 3 February 2011 President Obama informed the US Senate, pursuant to a provision added to the ratification resolution by Republican senators, that the administration's next arms control goal was to begin talks with Russia within one year on limiting stockpiles of non-strategic (tactical) nuclear weapons.³⁹ US officials emphasized that

numerous amendments to the treaty. 'Russian parliament revokes START treaty ratification', RT, 4 Nov. 2010, <<http://rt.com/politics/start-treaty-ratification-duma/>>.

³⁴ Sokov, N., 'New Start ratification in Russia: apparent smooth sailing obscures submerged drama and revelations', James Martin Center for Nonproliferation Studies, 25 Jan. 2011, <http://cns.miis.edu/stories/110125_russia_new_start_ratification.htm>.

³⁵ Sokov (note 34). Russia has been particularly reluctant to disclose telemetric flight data about the manoeuvrable re-entry vehicles (RVs) that it plans to deploy.

³⁶ 'State Duma ratifies New START', *Moscow Times*, 26 Jan. 2011.

³⁷ 'Russian parliament's upper house ratifies U.S.–Russia arms cut deal', RIA Novosti, 26 Jan. 2011, <<http://rianovosti.com/russia/20110126/162309121.html>>.

³⁸ US State Department, Office of the Spokesman, 'New START Treaty entry into force', Fact sheet, 5 Feb. 2011, <<http://www.state.gov/r/pa/prs/ps/2011/02/156037.htm>>. The treaty's entry into force set in motion a number of preparatory steps for data exchanges, notifications and inspections.

³⁹ 'Resolution of advice and consent to ratification' (note 31), para. 12(i).

addressing tactical nuclear weapons would require close coordination with allies in the North Atlantic Treaty Organization (NATO) as well as deeper engagement with Russia on a range of security issues.⁴⁰ The Russian response, however, showed little interest, at least in the near term, in initiating negotiations on limiting non-strategic nuclear weapons.⁴¹

At the same time, both Russia and the USA hesitated to proceed with further reductions in strategic nuclear arms. Lavrov cautioned that 'before talking about any further steps in the sphere of nuclear disarmament, it is necessary to fulfil the New START agreement'.⁴² Other Russian officials echoed Lavrov's comments, claiming that further nuclear arms reductions were linked with progress on other issues affecting strategic stability. These included limiting non-deployed warheads, missile defence, long-range conventional strike weapons and weapons in space.⁴³ Senior US officials emphasized that new negotiations would require an expansion of the arms control agenda that would involve numerous difficulties.⁴⁴ In addition, following the completion of the controversial 2010 Nuclear Posture Review, the administration reportedly was reluctant to consider deeper cuts that would require changes to the structure of the triad of US nuclear forces.⁴⁵

III. International cooperation to enhance nuclear security

On 12–13 April President Obama hosted in Washington, DC, a summit-level meeting on nuclear security. The event was attended by 47 world leaders, including 38 heads of state or government.⁴⁶ It was held as part of an ambitious US-led effort to strengthen international cooperation to prevent

⁴⁰ Benitez, J., 'US consults with NATO allies on reducing tactical nuclear weapons', NATO Source, Atlantic Council, 17 Feb. 2011, <<http://www.acus.org/natosource/us-consults-nato-allies-reducing-tactical-nuclear-weapons>>. In NATO's new Strategic Concept, adopted at the Nov. 2010 Lisbon Summit meeting, the NATO member states agreed to continue the discussion of the role of defence and deterrence in NATO's strategy, including its nuclear posture. North Atlantic Treaty Organization (NATO), 'Active engagement, modern defence: strategic concept for the defence and security of the members of the North Atlantic Treaty Organisation', 19 Nov. 2010, Lisbon, <<http://www.nato.int/strategic-concept/>>

⁴¹ 'Russia says too early to talk tactical nuclear weapons with United States', RIA Novosti, 29 Jan. 2011, <http://rianovosti.com/military_news/20110129/162362622.html>; and Sokov (note 34).

⁴² Quoted in Pincus, W., 'Cold war issues still part of U.S.–Russia discussions', *Washington Post*, 17 Jan. 2011.

⁴³ Sokov and Pomper (note 29).

⁴⁴ Dombey, D., 'Obstacles strew path to deeper nuclear cuts', *Financial Times*, 23 Dec. 2010. On the review see chapter 7, section II, in this volume.

⁴⁵ Pifer, S., 'After New START: what next?', *Arms Control Today*, vol. 40, no. 10 (Dec. 2010). See also chapter 7, section II, in this volume.

⁴⁶ White House, Office of the Press Secretary, 'Communiqué of the Washington Nuclear Security Summit', 13 Apr. 2010, <<http://www.whitehouse.gov/the-press-office/communiqu-washington-nuclear-security-summit>>. For an assessment of the summit meeting see Turpen, E., 'Global lockdown: moving the needle on nuclear security', Policy Analysis Brief, Stanley Foundation, Nov. 2010, <<http://www.stanleyfoundation.org/resources.cfm?id=434>>.

nuclear terrorism, which Obama had identified in a speech in Prague in 2009 as ‘the most immediate and extreme threat to global security’.⁴⁷

At the end of the two-day event, the participating states and international organizations adopted a concluding communiqué.⁴⁸ It emphasized ‘the fundamental responsibility of states to maintain effective security of all nuclear materials’ and laid out a number of broad objectives for international cooperation in this area. The communiqué reaffirmed the participants’ support for existing agreements and mechanisms designed to secure the storage, handling and transport of nuclear material while explicitly embracing the goal set by President Obama in his Prague speech of securing all vulnerable nuclear material worldwide within four years. At the same time, recognizing the concerns of states pursuing civil nuclear energy programmes, the communiqué called for ‘the implementation of strong nuclear security practices that will not infringe upon the rights of states to develop and utilize nuclear energy for peaceful purposes’.

The summit meeting participants adopted a work plan for realizing the goals set out in the communiqué.⁴⁹ Among other steps, the work plan urged states to ratify the 2005 amendment to the Convention on the Physical Protection of Nuclear Material, which places legal requirements on signatories to protect their nuclear facilities and material and expands cooperation in recovering stolen material.⁵⁰ The work plan also highlighted the importance of United Nations Security Council Resolution 1540 and the 2005 International Convention for the Suppression of Acts of Nuclear Terrorism.⁵¹ More generally, it expressed support for the conversion of civilian facilities from highly enriched uranium (HEU) to non-weapon-useable materials; research on new low-enriched uranium (LEU) fuels; detection methods and nuclear forensic technologies; development of corporate and institutional cultures that prioritize nuclear security; and joint exercises among law enforcement and customs officials to enhance nuclear detection capabilities.⁵²

The Nuclear Security Summit meeting did not lead to new joint initiatives. However, in conjunction with the meeting, 29 states announced steps to adopt or implement a range of existing conventions, agreements and

⁴⁷ White House, Office of the Press Secretary, ‘Remarks by President Barack Obama, Hradcany Square, Prague, Czech Republic’, 5 Apr. 2009, <http://www.whitehouse.gov/the_press_office/Remarks-By-President-Barack-Obama-In-Prague-As-Delivered/>.

⁴⁸ White House (note 46).

⁴⁹ White House, Office of the Press Secretary, ‘Nuclear Security Summit Work Plan’, 13 Apr. 2010, <<http://www.whitehouse.gov/the-press-office/nuclear-security-work-plan-reference-document>>.

⁵⁰ For a description of the amendment see Kile, S. N., ‘Nuclear arms control and non-proliferation’, *SIPRI Yearbook 2006*, pp. 636–37; and annex A in this volume.

⁵¹ UN Security Council Resolution 1540, 28 Apr. 2004; and International Convention for the Suppression of Acts of Nuclear Terrorism, adopted 13 Apr. 2005, opened for signature 14 Sep. 2005, entered into force 7 July 2007, *United Nations Treaty Series*, vol. 2445 (2007).

⁵² White House (note 49); and Turpen (note 46), pp. 2–3.

measures for enhancing nuclear security and combating illicit trafficking in nuclear materials.⁵³ This included undertakings by several states (e.g. Kazakhstan, Mexico, Ukraine and Viet Nam) to convert nuclear research reactors from HEU to LEU fuel and to eliminate or remove HEU from their territories.⁵⁴ The urgency of these steps had been underscored the month before the summit meeting, when Georgia revealed that it had intercepted a group of smugglers trying to sell 18 grams of HEU on the black market.⁵⁵ In addition, several states announced plans to establish centres to develop and promote best practices in the field of nuclear security.

The next nuclear security summit meeting is scheduled for 2012 in South Korea. In the interim, representatives from the participating states will meet periodically to evaluate progress on the work plan.

Russian–US plutonium disposition agreement

On 13 April 2010 in a ceremony on the sidelines of the Nuclear Security Summit, Russian Foreign Minister Lavrov and US Secretary of State Clinton signed the Plutonium Disposition Protocol, which updated the 2000 Russian–US Plutonium Management and Disposition Agreement (PMDA).⁵⁶ The event was hailed as a further step towards enhancing nuclear security and making nuclear arms reductions irreversible.

Under the terms of the amended agreement, each party will dispose of at least 34 tonnes of weapon-grade plutonium declared to be in excess of defence needs by fabricating it into mixed oxide uranium–plutonium (MOX) fuel and irradiating it in nuclear power reactors to produce electricity. The protocol was essential for implementation of the PMDA since the Russian disposition approach set out in 2000 had proved unfeasible because of technical, legal and financial obstacles.⁵⁷ The protocol also enhanced ‘the rights, obligations, principles and measures for monitor-

⁵³ White House, Office of the Press Secretary, ‘Highlights of the national commitments made at the Nuclear Security Summit’, 13 Apr. 2010, <<http://www.whitehouse.gov/the-press-office/highlights-national-commitments-made-nss>>.

⁵⁴ White House (note 53).

⁵⁵ ‘Georgia files charges in HEU smuggling scheme’, Global Security Newswire, 29 Apr. 2010, <http://www.globalsecuritynewswire.org/gsn/nw_20100429_1185.php>; and Esslemont, T., ‘Georgia foils bid to smuggle weapons-grade uranium’, BBC News, 8 Nov. 2010, <<http://www.bbc.co.uk/news/world-europe-11709416>>.

⁵⁶ Russian–US Agreement Concerning the Management and Disposition of Plutonium Designated as No Longer Required for Defense Purposes and Related Cooperation, signed on 29 Aug. and 1 Sep. 2000; and Protocol to the agreement, signed 13 Apr. 2010, <<http://www.state.gov/t/isn/trty/>>. See also US Department of State, Office of the Spokesman, ‘2000 Plutonium Management and Disposition Agreement’, Fact sheet, 13 Apr. 2010, <<http://www.state.gov/r/pa/prs/ps/2010/04/140097.htm>>.

⁵⁷ The protocol confirmed an agreement reached in 2007 that permits Russia to dispose of its plutonium in fast-neutron reactors (BN-600 and BN-800) rather than light water reactors, as originally proposed. Horner, D., ‘Russia, U.S. sign plutonium disposition pact’, *Arms Control Today*, vol. 40, no. 4 (May 2010).

ing and inspecting each side's disposition activities and their end products' to ensure that the material will never be used for nuclear weapon purposes.⁵⁸ Both countries plan to begin disposition activities by 2018, after the necessary facilities are completed.⁵⁹ They requested the assistance of the International Atomic Energy Agency (IAEA) in monitoring implementation, with the specific verification arrangements to be discussed.⁶⁰

IV. The 2010 Non-Proliferation Treaty Review Conference

The 2010 NPT Review Conference was held at the UN Headquarters in New York on 3–28 May 2010.⁶¹ Delegations from 172 of the states parties to the NPT participated, with Ambassador Libran Cabactulan of the Philippines serving as the conference president.⁶² The meeting was characterized by a cordial and generally constructive atmosphere, in marked contrast to the 2005 Review Conference.⁶³

Principal issues and outcomes

The first week of the conference was devoted to a general debate on the implementation of the NPT and the promotion of its principles and objectives. More than 90 states parties delivered prepared statements, either on a national basis or as part of groups of states, raising a number of perennial issues. These included bringing the 1996 Comprehensive Nuclear-Test-Ban Treaty (CTBT) into force;⁶⁴ opening negotiations on a global treaty banning the production of fissile material for military purposes; enhancing transparency in nuclear weapon inventories and production complexes; making NPT membership universal; establishing a nuclear weapon-free zone in the Middle East; and concluding a global treaty on negative security assurances—that is, on a legally binding commitment by the five legally recognized nuclear weapon states (NWS)—China, France, Russia, the United Kingdom and the USA—not to use, or threaten to use, nuclear weapons against non-nuclear weapon states (NNWS) parties to the NPT.⁶⁵ US Sec-

⁵⁸ US Department of State (note 56). These included measures to minimize the potential proliferation problems associated with using fast-neutron reactors.

⁵⁹ The Russian Government will spend \$2.5 billion to implement the amended agreement. The USA will provide up to \$400 million in assistance to Russia. Horner (note 57).

⁶⁰ 'US and Russia request IAEA monitoring of plutonium disposition', *Trust & Verify*, no. 130 (July/Sep. 2010), p. 8.

⁶¹ For a summary and other details of the 1968 Treaty on the Non-Proliferation of Nuclear Weapons (Non-Proliferation Treaty) see annex A in this volume.

⁶² 2010 NPT Review Conference, 'Background', <<http://www.un.org/en/conf/npt/2010/background.shtml>>.

⁶³ For a summary of the 2005 Review Conference see Kile (note 50), pp. 608–18.

⁶⁴ For a summary and other details of the CTBT see annex A in this volume.

⁶⁵ As defined in Article IX of the NPT, only states that manufactured and exploded a nuclear device prior to 1 Jan. 1967 are recognized as nuclear weapon states.

retary of State Clinton set a positive tone in the opening session when she announced that the USA would take steps to implement protocols for the African and South East Asian nuclear weapon-free zone treaties.⁶⁶ In a gesture towards greater transparency, Clinton also publicly revealed for the first time the number of operational warheads in the US nuclear stockpile: 5113.⁶⁷

The conference's substantive work began in the second week. Following the practice of previous review conferences, the secretariat had established three main committees (MCs): MC.I, on nuclear disarmament; MC.II, on non-proliferation, including safeguards and regional issues; and MC.III, on nuclear safety and the peaceful uses of nuclear energy.⁶⁸ The states parties approved the creation of a single subsidiary body under each of the main committees and allocated the issues to be discussed.⁶⁹ The subsidiary body under MC.I covered practical disarmament steps, including security assurances. The subsidiary body under MC.II covered regional issues, including those related to establishing a weapon of mass destruction-free zone in the Middle East, while the subsidiary body under MC.III considered 'other provisions of the treaty', including how to respond to a state party's withdrawal from the NPT.

Much of the discussion in MC.I focused on the set of practical steps towards nuclear disarmament that were adopted at the 2000 Review Conference but only partly implemented.⁷⁰ These included making deeper and irreversible cuts in existing arsenals; placing excess military fissile material under international control; reducing the operational status of strategic nuclear forces maintained on high alert; negotiating legally binding limits on tactical nuclear weapons; and diminishing the role and salience of nuclear weapons in national security policies. The nuclear weapon states were also urged to 'declare a moratorium on upgrading and developing new types of nuclear weapons, or developing new missions for nuclear weapons'.⁷¹

⁶⁶ For summaries of the 1996 Treaty of Pelindaba, establishing an African nuclear weapon-free zone, and the 1995 Treaty of Bangkok, establishing a South East Asian nuclear weapon-free zone, see annex A in this volume.

⁶⁷ US Department of State, Office of the Spokesman, 'Secretary Clinton's remarks at NPT Review Conference', 3 May 2010, <<http://www.america.gov/st/texttrans-english/2010/May/20100504083001bpuh7.084292e-02.html>>. See also chapter 7, section II, in this volume.

⁶⁸ The main committee structure corresponds to the three 'pillars' of the NPT. The chairpersons were Boniface Chidyaisiku (Zimbabwe), MC. I; Volodymyr Yelchenko (Ukraine), MC.II; and Takeshi Nakane (Japan), MC.III.

⁶⁹ Johnson, R., 'Day 3 at NPT: P-5 statement and 3 subsidiary bodies', Acronym Institute, 5 May 2010, <<http://acronyminstitute.wordpress.com/2010/05/05/day-3-interim/>>.

⁷⁰ See Simpson, J., 'The 2000 NPT Review Conference', *SIPRI Yearbook 2001*, pp. 494–97.

⁷¹ Statement by Ambassador Hisham Badr, Permanent Representative of Egypt to the United Nations in Geneva, on behalf of the New Agenda Coalition, Main Committee I, Nuclear Non-Proliferation Treaty 2010 Review Conference, 7 May 2010, <http://www.un.org/en/conf/npt/2010/statements/statements_day_04may.shtml>.

One notable feature of the discussions was the renewed call from non-nuclear weapon states parties belonging to the Non-Aligned Movement (NAM) for the conference to endorse the negotiation of a nuclear weapon convention.⁷² This would ban the development, acquisition, possession or use of nuclear weapons. The NAM states insisted that the treaty should be implemented within a clearly defined time frame.⁷³ The NWS, with the partial exception of China, rejected the idea of setting a firm timeline for achieving nuclear disarmament and refused to embrace proposals for a nuclear weapon convention.⁷⁴ Because of their objections, the final document did not include specific dates but did retain a commitment by the NWS to ‘accelerate progress on steps toward nuclear disarmament’.⁷⁵

In MC.II the controversy over Iran’s nuclear programme received relatively little attention against the background of breaking diplomatic developments in other forums (see section V below). Instead, the discussions focused primarily on the status of the IAEA’s 1997 Model Additional Protocol; nuclear export control and regulatory arrangements; and the endorsement in 2008 of the US–India Civil Nuclear Cooperation Initiative by the Nuclear Suppliers Group (NSG). Considerable debate arose regarding the language in the Committee’s draft action plan, which was introduced by the NWS and Western NNWS and endorsed requiring recipient states to have an additional protocol in force as a condition for the supply of nuclear materials and technology. This was opposed by some NAM states, which argued that doing so would infringe on their ‘inalienable’ right under Article IV of the NPT to develop nuclear energy for peaceful purposes.

Among other topics, the discussions in MC.III devoted particular attention to proposals for establishing nuclear fuel supply assurances and, more generally, multilateral arrangements for managing the nuclear fuel cycle. Among Western NNWS, Sweden iterated the need for multilateral nuclear fuel assurances and highlighted the work of the IAEA in this area.⁷⁶ While not directly rejecting these proposals, the NAM states emphasized the

⁷² For a description and list of members of NAM see annex B in this volume.

⁷³ ‘Elements for a plan of action for the elimination of nuclear weapons’, Working paper submitted by the Group of the Non-Aligned States Parties to the Treaty on the Non-Proliferation of Nuclear Weapons, 28 Apr. 2010, NPT/CONF.2010/WP.47, <<http://www.un.org/en/conf/npt/2010/workingpapers.shtml>>. Egypt submitted a working paper that laid out a timetable consisting of 3 phased measures aimed at completing nuclear disarmament by 2025.

⁷⁴ France took the lead in arguing that proposals for a time-bound disarmament framework were unrealistic and must take into account prevailing ‘political and strategic conditions’. Remarks by Ambassador Eric Danon, Permanent Representative of France to the Conference on Disarmament, Summary record of first meeting, MC.I, NPT/CONF.2010/MC.I/SR.1, 7 May 2010, <<http://www.un.org/en/conf/npt/2010/maincommittees.shtml>>.

⁷⁵ Crail, P., ‘NPT parties agree on Middle East meeting’, *Arms Control Today*, vol. 40, no. 5 (June 2010).

⁷⁶ Statement by the delegation of Sweden, Main Committee III, NPT Review Conference, 11 May 2010, <http://www.swedenabroad.com/Page_____107139.aspx>.

importance of proceeding on the basis of ‘the principle of non-discrimination’ and respect for the legal rights of the parties under the treaty.⁷⁷

In the MC.III subsidiary body disagreements emerged over proposed measures to make withdrawing from the NPT more difficult and costly. With the precedent set by North Korea in mind, the USA and other Western countries sought to require that a state choosing withdrawal would have to return all nuclear-related material and technology supplied to it while a party to the treaty and would remain responsible for any violations of the NPT committed prior to withdrawal. Other states, including Iran, Libya and Syria, rejected these measures as being tantamount to a reinterpretation of Article X of the NPT; many other views were expressed as well.⁷⁸ As a result, the final document affirmed the right of a party to withdraw from the NPT with the note that ‘numerous states’ had specific views regarding the consequences that would follow a withdrawal.⁷⁹

Weapon of mass destruction-free zone in the Middle East

One of the most contentious issues at the conference dealt with implementation of the resolution on the Middle East adopted at the 1995 Review and Extension Conference.⁸⁰ The resolution had called for ‘all States in the Middle East to take practical steps’ towards establishing an effectively verifiable zone free of weapons of mass destruction (WMD) and their delivery systems. It also called for all NPT states parties ‘to extend their cooperation and to exert their utmost efforts with a view to ensuring the early establishment by regional parties’ of the zone.⁸¹

The discussions in the MC.II subsidiary body on implementing the resolution, which in the view of many states parties had languished since 1995, focused on a proposal put forward by Egypt for the ‘launching’ of a regional conference in 2012. Egypt, with the support of Arab League states, insisted that the conference should have a negotiating mandate and create a standing committee to monitor progress towards a WMD-free zone in the

⁷⁷ Statement of Ambassador Maged Abdelaziz, Permanent Representative of Egypt to the United Nations, on behalf of the Group of Non-Aligned States Parties, Main Committee III, 2010 NPT Review Conference, 10 May 2010, <http://www.reachingcriticalwill.org/legal/npt/revcon2010/statements/10May_MCIIL_NAM.pdf>.

⁷⁸ Singelee, M., ‘NPT day 13: roundup on Main Committee III on nuclear energy, safety, security and institutional issues’, Acronym Institute, 17 May 2010, <<http://acronyminstitute.wordpress.com/2010/05/17/day-13-committee-iii/>>.

⁷⁹ 2010 NPT Review Conference, Final Document, NPT/CONF.2010/50 (Vol. I), 28 May 2010, <<http://www.un.org/en/conf/npt/2010/confdocs.shtml>>, paras. 119–21.

⁸⁰ 1995 NPT Review Conference, ‘Resolution on the Middle East’, NPT/CONF.1995/32 (Part I), Annex, 11 May 1995, <<http://www.un.org/Depts/ddar/nptconf/2142.htm>>. The resolution was adopted along with decisions on ‘Strengthening the review process’ and ‘Principles and objectives for nuclear disarmament’ that were linked to the states parties consensus agreement to extend the NPT indefinitely. See Simpson, J., ‘The nuclear non-proliferation regime after the Review and Extension Conference’, *SIPRI Yearbook 1996*, pp. 561–73.

⁸¹ 1995 NPT Review Conference (note 80).

Middle East.⁸² In contrast, the USA argued that a negotiating mandate would be premature in the current security context and that the conference should be limited to discussing the modalities involved in establishing such a zone. There were also differences over whether to designate an envoy or ‘facilitator’, who would conduct consultations and undertake preparations for the regional conference.⁸³

In the final document, the states parties endorsed an approach to implementing the 1995 resolution that elided the dispute over the proposed conference’s mandate. It called for the convening of a conference in 2012 by the UN Secretary-General and the co-sponsors of the resolution (Russia, the UK and the USA) ‘to be attended by all States of the Middle East on the establishment of a Middle East zone free of nuclear weapons and all other weapons of mass destruction, on the basis of arrangements freely arrived at by the states of the region, and with the full support and engagement of the nuclear-weapon states’.⁸⁴ In addition, the convening parties would appoint a facilitator to support implementation of the 1995 resolution by conducting consultations with the states of the region and preparing for the convening of the conference. The facilitator would also assist in implementing unspecified follow-on steps agreed by the participating regional states.⁸⁵

Adoption of a final document

On 25 May with the Review Conference drawing to a close, Cabactulan put forward a draft final document based on the substantive reports submitted by the chairs of the main committees and their respective subsidiary bodies. The draft document was divided into two sections: one reviewing progress in implementing the three pillars of the NPT and the other setting out a forward-looking action plan. The draft was criticized by many NNWS for weakening the language on disarmament contained in the reports of MC.I and its subsidiary body. In contrast, the NWS complained that the disarmament measures endorsed in the draft text were too ambitious.⁸⁶ In addition, disagreements arose over items related to non-proliferation and the peaceful use of nuclear energy. Some Arab states also complained that the proposal for a conference in 2012 on a Middle East WMD-free zone did

⁸² For a list of members of the Arab League see annex B in this volume.

⁸³ Johnson, R., ‘NPT enters final week: high stakes, disarmament and Middle East’, Acronym Institute, 23 May 2010, <<http://acronyminstitute.wordpress.com/2010/05/24/final-week/>>; and Crail (note 75).

⁸⁴ 2010 NPT Review Conference (note 79), section IV, para. 7(a).

⁸⁵ 2010 NPT Review Conference (note 79), section IV, para. 7(b).

⁸⁶ ‘Consensus on disarmament eludes international nuclear conference’, Global Security News-wire, 25 May 2010, <http://gsn.nti.org/gsn/nw_20100525_6450.php>.

not put pressure on Israel, a non-party to the NPT, to take part in the conference.⁸⁷

On 27 May, the day before the conference was scheduled to conclude, Cabactulan put forward a revised draft text. In order to facilitate its adoption by consensus agreement, Cabactulan presented the review section as his personal reflection on the discussions of treaty implementation at the conference. The second section consisted of an action plan setting out 64 steps, grouped according to the treaty's three pillars, to serve as benchmarks by which progress could be assessed in the next five-year cycle. Cabactulan acknowledged that the draft text 'may not fully satisfy many' but was the 'very best that can be offered given the complexities of the issues'.⁸⁸

The adoption of the final document was complicated by Cabactulan's retention of language which reaffirmed 'the importance of Israel's accession' to the NPT and the 'placement of all of its nuclear facilities under IAEA safeguards'.⁸⁹ The language had been retained in the final document at the insistence of the Arab League, led by Egypt, over US objections. In the end the US delegation agreed to accept the mention of Israel in order not to block a consensus agreement.⁹⁰ On 28 May the states parties unanimously adopted the final document.⁹¹

Assessment of the 2010 Review Conference

The adoption by consensus of the final document was widely considered to be a successful conclusion to the conference. Despite the high expectations at the start, it had been unclear whether the states parties would be willing and able to unanimously agree on a complex agenda of implementation and compliance issues.

At the same time, however, the outcome highlighted long-standing differences in the states parties' views about the nature of the main challenges facing the NPT. The parties were unable to make progress on key issues related to strengthening safeguards and export controls aimed at ensuring that civil nuclear energy programmes are not diverted for military purposes. They also made no progress on proposals to make withdrawal

⁸⁷ Crail (note 75).

⁸⁸ Quoted in Johnson, R., 'NPT Day 24: future hope or failure?', Acronym Institute, 28 May 2010, <<http://acronyminstitute.wordpress.com/2010/05/28/day-24/>>.

⁸⁹ 2010 NPT Review Conference (note 79), section IV, para. 5.

⁹⁰ A senior US official issued a statement deploring 'the decision to single out Israel' while failing to mention Iran, 'a nation in long-standing violation of the NPT and UN Security Council resolutions'. White House, Office of the Press Secretary, 'Security Advisor's statement on NPT Review Conference', 28 May 2010, <<http://www.whitehouse.gov/the-press-office/statement-national-security-advisor-general-james-l-jones-non-proliferation-treaty->>.

⁹¹ MacFarquhar, N., '189 nations reaffirm goal of ban on nuclear weapons', *New York Times*, 28 May 2010.

from the NPT more difficult or to promote multilateral approaches to the nuclear fuel cycle. These measures had been resisted by some NNWS, which continued to emphasize the need for greater ‘balance’ in implementing the treaty’s non-proliferation and disarmament obligations. The NAM states parties were particularly critical of what they saw as the failure of the NWS to make sufficient progress towards fulfilling their commitment, codified in Article VI of the treaty, to work towards nuclear disarmament. In their view this posed at least as serious a threat to the viability of the NPT as so-called horizontal proliferation.

V. Iran and nuclear proliferation concerns

The year 2010 opened with few prospects for resolving the diplomatic impasse over Iran’s nuclear programme at the UN Security Council.⁹² Iran continued to defy the UN Security Council’s demands that it immediately suspend all activities related to its uranium enrichment programme and the construction of a heavy-water moderated nuclear reactor.⁹³ Iran also continued to reject the Security Council’s call for it to take a number of steps, in particular ratifying and implementing an additional protocol to its comprehensive safeguards agreement, which the IAEA Board of Governors had deemed necessary in order for Iran to restore international confidence about the exclusively peaceful nature of its nuclear programme.⁹⁴

Proposed nuclear fuel exchange deal

In 2010 diplomatic efforts revived a controversial fuel-exchange deal that had emerged in October 2009 during talks between Iran and the P5+1 states (the five permanent members of the UN Security Council—China, France, Russia, the UK and the USA—plus Germany).⁹⁵ The proposed deal would require Iran to ship most of its declared LEU stockpile out of the country for fabrication into fuel for the Tehran Research Reactor (TRR).⁹⁶ However, the deal had collapsed at the end of 2009, when Iran announced that it was not willing to send LEU abroad before the fuel intended for the TRR arrived in the country.⁹⁷

⁹² Kile, S. N., ‘Nuclear arms control and non-proliferation’, *SIPRI Yearbook 2008*, p. 340.

⁹³ UN Security Council resolutions 1696, 31 July 2006; 1737, 23 Dec. 2006; 1747, 24 Mar. 2007; 1803, 3 Mar. 2008; and 1835, 27 Sep. 2008.

⁹⁴ IAEA, Board of Governors, ‘Implementation of the NPT safeguards agreement in the Islamic Republic of Iran’, Resolution, GOV/2006/14, 4 Feb. 2006.

⁹⁵ On the fuel swap deal see Kile (note 7), pp. 388–89.

⁹⁶ The TRR, which is used to produce medical isotopes, has been operating on Argentinian fuel since 1993. The fuel is enriched to 19.7% in the isotope uranium-235. Iran lacked the capability to fabricate fuel rods to the specifications required by the TRR.

⁹⁷ Iran would instead consider a ‘simultaneous exchange’ on Iranian territory, on the Gulf island of Khish. Hafezi, P., ‘Iran rejects sending uranium abroad’, Reuters, 18 Nov. 2009.

The fuel exchange deal returned to the fore on 17 May 2010 when the foreign ministers of Brazil, Iran and Turkey issued a joint declaration laying out a plan under which Iran would export half of its LEU stockpile to Turkey, with IAEA supervision, in return for fuel from a third country for the TRR.⁹⁸ The terms of the arrangement were similar to those on which Iran and the P5+1 states had previously agreed in 2009.⁹⁹ However, US Secretary of State Clinton promptly denounced the plan as a ‘transparent ploy’ by Iran to avoid further action by the UN Security Council.¹⁰⁰ Further complicating reactions was the announcement by the Atomic Energy Organization of Iran (AEOI) that it would not stop enriching uranium to approximately 20 per cent uranium-235.¹⁰¹ The day after the deal was announced, the P5 states submitted to the Security Council an expedited draft resolution calling for additional punitive measures against Iran.¹⁰²

On 9 June 2010 the Security Council approved Resolution 1929, which imposed a fourth round of sanctions on Iran.¹⁰³ Twelve members voted in favour of the resolution; Brazil and Turkey—both temporary members of the Council—voted against it, complaining that the P5 states had not given sufficient time for them to pursue the fuel exchange agreement with Iran.¹⁰⁴ The USA said that while it had welcomed the Brazil–Turkey initiative, the proposed deal did not address ‘fundamental concerns’ about Iran’s nuclear programme. For its part, Iran strongly criticized the Security Council’s action and threatened to limit its cooperation with the IAEA.¹⁰⁵

Despite the new sanctions, Iran did not retract its proposal for a fuel swap, as it had earlier threatened to do, and maintained that engagement

⁹⁸ Turkish Ministry of Foreign Affairs, ‘Joint declaration of the ministers of foreign affairs of Turkey, Iran and Brazil’, 17 May 2010, <http://www.mfa.gov.tr/17_05_2010-joint-declaration-of-the-ministers-of-foreign-affairs-of-turkey_-iran-and-brazil_.en.mfa>.

⁹⁹ ‘Iran, Turkey, Brazil agree on nuclear deal’, *Tehran Times*, 18 May 2010. France, the UK and the USA pointed out that the revised deal would remove a smaller percentage of Iran’s total stockpile of LEU compared to the Oct. 2009 agreement, thereby lessening its value as a confidence-building measure. Crail, P., ‘Brazil, Turkey broker fuel swap with Iran’, *Arms Control Today*, vol. 40, no. 5 (June 2010).

¹⁰⁰ ‘Clinton: Iran nuclear fuel swap offer is “ploy”’, CBS News, 25 May 2010, <<http://www.cbsnews.com/stories/2010/05/25/world/main6517434.shtml>>.

¹⁰¹ ‘Iran says will continue 20 percent enrichment’, Reuters, 17 May 2010. On 8 Feb. 2010 Iran notified the IAEA that it would begin the enrichment of uranium up to 20% in the isotope uranium-235 at its Pilot Fuel Enrichment Plant (PFEP) at Natanz.

¹⁰² ‘Brazil, Turkey urge delay in UN sanctions vote on Iran’, BBC News, 19 May 2010, <<http://www.bbc.co.uk/news/10126252>>.

¹⁰³ UN Security Council Resolution 1929, 9 June 2010. For a description of the sanctions see appendix 11A in this volume.

¹⁰⁴ United Nations, Department of Public Information, ‘Security Council imposes additional sanctions on Iran’, Press Release SC/9948, 9 June 2010, <<http://www.un.org/News/Press/docs/2010/sc9948.doc.htm>>.

¹⁰⁵ ‘Tehran censures Security Council sanctions resolution’, Mehr News Agency, 11 June 2010, <<http://www.mehrnews.com/en/newsdetail.aspx?NewsID=1098885>>. On 21 June Iran announced that it had barred 2 IAEA inspectors from further visits to Iran for allegedly preparing ‘a false report’ about its nuclear activities. ‘Iran bars two U.N. inspectors in nuclear dispute’, Reuters, 21 June 2010.

with the P5+1 was still possible.¹⁰⁶ At the same time, the AEOI continued to enrich uranium up to 20 per cent at Natanz, stating that it had developed the technical capability to produce the fuel elements for the TRR. In August 2010 the IAEA reported that Iran had begun operating a second cascade of enrichment centrifuges at Natanz to enrich uranium up to 20 per cent.¹⁰⁷

As the year drew to a close, there were signs of renewed diplomatic efforts to break the impasse over Iran's nuclear programme. On 6–7 December Iran and the P5+1 states held discussions in Geneva, the first such meeting in more than a year. The parties announced that they had agreed to hold further talks, with Turkish support, in Istanbul in January 2011, but they did not identify any topics for discussion at the meeting.¹⁰⁸

IAEA Director General's reports of Iran's nuclear programme

During 2010 the new IAEA Director General, Yukiya Amano, issued three reports to the IAEA Board of Governors describing the agency's progress in verifying Iran's implementation of its comprehensive safeguards agreement and the status of Iran's compliance with relevant UN Security Council resolutions. The reports all concluded that, while the agency continued to verify the non-diversion of declared nuclear material in the country, Iran had not provided the necessary cooperation to permit it to confirm that all nuclear material in Iran was for peaceful activities. They also noted that the IAEA remained unable to make substantive progress in its investigation of Iranian nuclear activities with possible military dimensions because Iran had not provided the agency with requested information or provided access to Iranian personnel and records. The tougher tone of Amano's reports was widely seen as heralding a change in the IAEA's approach to the Iranian nuclear dossier compared to that of his predecessor, Mohamed ElBaradei.¹⁰⁹

On 23 November 2010 Amano issued a new report to the IAEA Board on the status of Iran's nuclear activities.¹¹⁰ The report indicated that Iran's uranium enrichment programme continued to face technical difficulties,

¹⁰⁶ 'Iran "ready for dialogue with P5+1"', Press TV, 13 June 2010, <<http://www.presstv.ir/detail.aspx?id=130120§ionid=351020104>>.

¹⁰⁷ Oleksyn, V., 'IAEA: Iran activates enrichment equipment', Associated Press, 9 Aug. 2010, <<http://abcnews.go.com/Technology/wireStory?id=11359906>>.

¹⁰⁸ 'Statement by EU High Representative Catherine Ashton on behalf of E3+3 after the talks with Iran, Geneva 6–7 December 2010', Brussels, 7 Dec. 2010, <http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/EN/foraff/118263.pdf>.

¹⁰⁹ Borger, J., 'Iran could be making nuclear warhead, says director of UN watchdog', *The Guardian*, 18 Feb. 2010.

¹¹⁰ IAEA, Board of Governors, 'Implementation of the NPT Safeguards Agreement and relevant provisions of Security Council resolutions in the Islamic Republic of Iran', Report by the Director General, GOV/2010/62, 23 Nov. 2010.

with a significant number of centrifuges installed at the commercial-scale Fuel Enrichment Facility (FEP) at Natanz not in operation. Iran told agency inspectors that enrichment operations at the FEP had been halted for one week in mid-November due to unspecified technical reasons. Iran resumed enrichment using 28 of Natanz's 164 machine-centrifuge cascades, which was one cascade fewer than had been operating earlier in the month.¹¹¹

Amano's report fuelled speculation that Iran was experiencing a high failure rate of its IR-1 centrifuges installed at the FEP due to a computer virus called Stuxnet that targeted foreign-supplied control equipment at the plant.¹¹² The Stuxnet computer code allegedly had been developed in Israel, with US assistance, using centrifuges identical in design to those used to enrich uranium at Natanz.¹¹³ On 29 November Iranian President Mahmoud Ahmadinejad acknowledged that a computer virus had 'created problems for a limited number of our centrifuges'.¹¹⁴ Iranian officials had previously confirmed that the Stuxnet virus infected staff computers at the Bushehr nuclear power plant but said it did not affect major systems.¹¹⁵

The development of the virus appeared to be part of a campaign of sabotage and covert operations aimed at slowing Iran's nuclear programme.¹¹⁶ Israeli and US officials disavowed responsibility but suggested that the activities had reduced the prospects of a military strike on Iran's nuclear facilities by buying more time for diplomatic efforts to succeed.¹¹⁷

VI. North Korea's nuclear programme

In 2010 no progress was made towards restarting the suspended Six-Party Talks over the future of North Korea's nuclear weapon programme.¹¹⁸ The talks had broken down in April 2009, when North Korea announced that it had permanently withdrawn from the negotiations and would no longer be bound by any previous agreements. At the same time, North Korea expelled

¹¹¹ IAEA, GOV/2010/62 (note 110), p. 2.

¹¹² Albright, D., Brannan, P. and Walrond, C., 'Did Stuxnet take out 1,000 centrifuges at the Natanz enrichment plant? Preliminary assessment', Institute for Science and International Security (ISIS), ISIS Reports, 22 Dec. 2010, <<http://isis-online.org/isis-reports/category/iran/>>.

¹¹³ Broad, W., Markoff, J. and Sanger, D., 'Israeli test on worm called crucial in Iran nuclear delay', *New York Times*, 15 Jan. 2011.

¹¹⁴ 'Iran says nuclear programme was hit by sabotage', BBC News, 29 Nov. 2010, <<http://www.bbc.co.uk/news/world-middle-east-11868596>>.

¹¹⁵ Keizer, G., 'Iran admits Stuxnet worm infected PCs at nuclear reactor', *Computerworld*, 27 Sep. 2010.

¹¹⁶ Chick, K., 'Iran nuclear scientists targeted in Tehran blasts', *Christian Science Monitor*, 29 Nov. 2010. In Nov. 2010 one Iranian nuclear scientist was killed and another injured in car bomb attacks that Iran attributed to Israel.

¹¹⁷ MacAskill, E., 'Stuxnet cyberworm heads off strike on Iran', *The Guardian*, 18 Jan. 2011.

¹¹⁸ The 6-Party Talks had begun in Aug. 2003 as a Chinese diplomatic initiative aimed at resolving the controversy over how to address North Korea's suspected nuclear weapon programme. In addition to China and North Korea, the other parties are Japan, South Korea, Russia and the USA.

IAEA inspectors from the country and informed the agency that it would restart its nuclear weapon production facilities at Yongbyon.¹¹⁹

In January 2010 the North Korean Foreign Ministry stated that the country would be prepared to return to the Six-Party Talks if it could first make progress in bilateral negotiations with the USA, namely, in concluding a peace treaty to formally end the 1950–53 Korean War. According to the statement, the opening of negotiations was contingent on the lifting by the USA of all sanctions against North Korea.¹²⁰ The USA rejected the sequencing of the proposed steps.¹²¹ It reiterated that North Korea had to begin to verifiably abandon its nuclear weapon programme, pursuant to implementing the September 2005 Joint Declaration, before the USA would discuss a possible lifting of sanctions or concluding a peace treaty.¹²²

As the year progressed, the prospects for resuming the Six-Party Talks receded against the background of several inter-Korean military incidents.¹²³ In the summer and autumn of 2010, China took the diplomatic lead in attempting to revive the six-party process. On 15 October after a meeting between the Chinese foreign minister and a senior North Korean official, China called on the other participating states to return to the negotiations.¹²⁴ This was reportedly rebuffed by Japan and the USA, which insisted that any talks should be preceded by a substantive inter-Korean security dialogue.¹²⁵

Although the North Korean leadership reaffirmed the country's commitment to eventually give up its nuclear weapon programme, no signs emerged indicating that North Korea was prepared to resume implementing the denuclearization measures it had agreed to as part of a deal reached in the Six-Party Talks in 2007.¹²⁶ Statements issued during the year by the Foreign Ministry and the official news agency emphasized that North Korea was compelled to retain its nuclear deterrent for self-defence in light of the 'hostile policy' of the USA.¹²⁷ In June the North Korean Foreign Ministry warned that the USA's continued military threats and provo-

¹¹⁹ Kile (note 6), pp. 390–91.

¹²⁰ Korean Central News Agency (KCNA), 'DPRK proposes to start of peace talks', 11 Jan. 2010, <<http://www.kcna.co.jp/item/2010/201001/news11/20100111-03ee.html>>.

¹²¹ Powell, B., 'Is North Korea ready to do (another) nuke deal?', *Time*, 11 Jan. 2010.

¹²² In a Joint Statement issued 19 Sep. 2005, the 6 parties agreed on an aid package for North Korea in exchange for North Korea's pledge to 'abandon all nuclear weapons and existing nuclear programs'. 'Joint Statement of the Fourth Round of the Six-Party Talks', Ministry of Foreign Affairs of the People's Republic of China, 19 Sep. 2005, <<http://www.fmprc.gov.cn/eng/zxxx/t212707.htm>>.

¹²³ See e.g. annex C in this volume.

¹²⁴ 'China urges resumption of N. Korea nuclear talks', Channel NewsAsia, 14 Oct. 2010, <http://www.channelnewsasia.com/stories/afp_asiapacific/view/1087100/1/html>.

¹²⁵ Powell (note 121).

¹²⁶ 'DPRK's Kim says committed to nuclear disarmament', *China Daily*, 10 May 2010. On the 2007 denuclearization agreement see Kile (note 92), pp. 351–53.

¹²⁷ Korean Central News Agency (KCNA), 'KCNA snubs call for DPRK's dismantlement of nukes', 19 Feb. 2010, <<http://www.kcna.co.jp/item/2010/201002/news19/20100219-07ee.html>>.

cations meant that the country had no choice but to ‘bolster its nuclear deterrent’, including in an unspecified ‘newly developed way’.¹²⁸ This led some to speculate that North Korea might be preparing to conduct a third nuclear test explosion, possibly using a new weapon design.¹²⁹

International concerns about the scope and trajectory of North Korea’s nuclear programme were heightened when in November 2010 a delegation of US scientists was shown a previously undeclared centrifuge enrichment facility at the Yongbyon nuclear complex.¹³⁰ While North Korea insisted that the enrichment plant was intended to produce nuclear fuel for civil power reactors, the revelation reinforced long-standing US suspicions that North Korea had concealed fuel cycle facilities that were part of a secret programme to produce HEU for use in nuclear weapons.

In December 2010 North Korean officials unexpectedly told Bill Richardson, a former US ambassador to the UN who was on an unofficial trip to Pyongyang, that they were prepared to readmit IAEA inspectors to the country and grant them access to the Yongbyon enrichment plant to verify that it was not producing HEU.¹³¹ They were also willing to discuss selling 12 000 fresh nuclear reactor fuel rods to a third country. US officials promptly dismissed the offered concessions as insincere and ruled out any near-term resumption of the Six-Party Talks, citing North Korea’s failure to adhere to its previous commitments.¹³² The year ended as it had begun, with a diplomatic impasse over the fate of the country’s nuclear programme, amid indications that North Korea was prepared to hold on to its nascent nuclear weapon capabilities for the indefinite future.

VII. Conclusions

In 2010 there were several notable achievements for treaty-based approaches to arms control and disarmament as well as multilateral action to address proliferation challenges based on international law. The year witnessed an ‘arms control spring’, with important achievements for both bilateral and multilateral nuclear arms control, disarmament and non-proliferation initiatives.

As the year ended, however, the prospects for significant new advances on the arms control and disarmament agenda remained unclear. Much

¹²⁸ Korean Central News Agency (KCNA), ‘Foreign Ministry vows to bolster nuclear deterrent in new way’, 28 June 2010, <<http://www.kcna.co.jp/item/2010/201006/news28/20100628-12ee.html>>.

¹²⁹ Lewis, J., ‘“Newly developed way” for NORK nukes?’, Arms Control Wonk, 28 June 2010, <<http://lewis.armscontrolwonk.com/archive/2782/newly-developed-way-for-nork-nukes>>.

¹³⁰ See chapter 7, section X, in this volume.

¹³¹ ‘US envoy Bill Richardson: North Korea “making progress”’, BBC News, 21 Dec. 2010, <<http://www.bbc.co.uk/news/world-asia-pacific-12047097>>.

¹³² ‘U.S. rejects nuclear talks with North Korea’, Global Security Newswire, 22 Dec. 2010, <http://gsn.nti.org/gsn/nw_20101222_7792.php>.

important unfinished business remained on that agenda, in particular the opening of negotiations on the long-stalled fissile material cut-off treaty and the bringing into force of the CTBT. Questions also emerged regarding how to follow up on the Russian–US New START treaty, one of the key achievements in 2010. In the view of some observers, the treaty may well represent the last ‘traditional’ arms control agreement: that is, one focused solely on limiting and reducing the strategic nuclear forces of Russia and the USA. Further steps towards reducing nuclear arsenals will require expanding the bilateral agenda to address a number of different and difficult issues—from tactical nuclear weapons and non-deployed warheads to broader strategic stability issues related to ballistic missile defence, space weapons and conventionally armed strategic launchers. It will also be likely to require expanding the nuclear arms reduction process to include the other nuclear weapon states—a development that was presaged in 2010 by preliminary discussions among the P5 states about holding multilateral talks on reducing their arsenals.

Developments during the year also highlighted persisting weaknesses in the NPT, which forms the principal legal and normative basis of the global non-proliferation regime. While the 2010 NPT Review Conference was widely hailed as a success, the discussions during the conference clearly revealed the continuing deep divisions among the states parties—especially between the nuclear weapon ‘haves’ and ‘have-nots’—over the basic aims and goals of the NPT. These divisions cast doubt on the prospects for making tangible progress in implementing even the modest steps endorsed in the final document. More fundamentally, they suggested that the states parties must address not only challenges to treaty implementation and compliance but also, ultimately, the normative legitimacy of the NPT regime.